

Species of *Ditropopsis* E.A.Smith, 1897 (Architaenioglossa: Cyclophoridae) from the Papuan region

KRISTINE GREKE

Stopiņu novads, Dārza iela 10, LV-2130, Dzidriņas, Latvia; k.greke@gmail.com

Abstract: Representatives of the gastropod genus *Ditropopsis* E.A.Smith, 1897 (Architaenioglossa: Cyclophoridae) from New Guinea, Raja Ampat and Moluccan Archipelago are revised. In total, 11 species are confirmed for the study region. The type species for the genus *Ditropopsis* E.A.Smith, 1897 is here designated. The following new synonymy is proposed: *Ditropopsis* E.A.Smith, 1897 = *Diaspira* Soós, 1911 syn. nov. Lectotypes are designated for two species - *Ditropopsis fultoni* E.A.Smith, 1897 and *D. papuana* E.A.Smith, 1897. Three species new to science were described and illustrated, namely *Ditropopsis benthemjuttingi* sp. nov., *D. mirabilis* sp. nov., and *D. tritonensis* sp. nov. New faunal information on previously known species is presented. A new key to *Ditropopsis* from the Papuan biogeographical region and an annotated species list are presented for the first time.

Key words: Mollusca, Gastropoda, Cyclophoridae, *Ditropopsis*, Papuan region, taxonomy, biogeography, new species, identification.

Introduction

Eight species of genus *Ditropopsis* E.A.Smith, 1897 were previously known from the Papuan region sensu lato (The Moluccas, Raja Ampat islands, New Guinea, and Solomon Islands). Most of these were described more than one hundred years ago, but two species were added by van Benthem Jutting in 1958 and 1963. No keys or checklists exist for the genus *Ditropopsis* from the study region.

During the 2009-2010 two zoological expeditions held by the Entomological Society of Latvia were taken to Raja Ampat Islands and the West of New Guinea. In total, five species of *Ditropopsis* were collected from five different localities. Among them were three species new to science, namely *Ditropopsis benthemjuttingi* sp. nov. (Raja Ampat: Misool Island), *D. mirabilis* sp. nov. (Indonesian Papua: Onin Peninsula), and *D. tritonensis* sp. nov. (Indonesian Papua: southern Bird's Neck).

Additionally, redescrptions of two insufficiently known species - *Ditropopsis fultoni* E.A.Smith, 1897 and *D. papuana* E.A.Smith, 1897 are given and lectotypes are designated for both these species. Type species of the genus *Ditropopsis* is also designated. One new synonymy is proposed on base of morphological similarity between *Ditropopsis* and *Diaspira* Soós, 1911.

Material and Methods

All specimens described below were collected by hand and are preserved in 70% ethanol. Specimens were studied using a Leica S6D stereomicroscope. Specimen photographs were taken using a Canon EOS 450D SLR camera attached to the microscope, and CombineZP software was used for image stacking. Holotypes of the newly described species are deposited in the collection of Natural History Museum of Erfurt. All species are listed alphabetically, since a phylogenetic arrangement is impossible. All label data is reproduced exactly, with no corrections or additions; labels (if more than one for the same specimen) are separated by slashes (/). If not otherwise stated, all labels are printed. Author's comments are placed in square brackets [].

The following abbreviations are used:

BMNH – British Museum (Natural History), London, United Kingdom;
KGC – collection Kristine Greke, Dzidriņas, Latvia;
NME – Naturkundemuseum Erfurt, Germany;
SMF – Senckenberg Forschungsinstitut und Naturmuseum, Frankfurt am Main, Germany.



Systematic part and new faunal information

The genus *Ditropopsis* was established by E.A.Smith (1897) for *Ditropopsis papuana* and '*D. (?) fultoni*'. The type species for this genus has not been fixed in original description, nor by later authors. Herewith I declare *Ditropopsis papuana* E.A.Smith, 1897 as the **type species** for the genus *Ditropopsis* E.A.Smith, 1897.

Fukuda (2000) listed the following subgenera of *Ditropopsis*: *Ditropopsis* s. str., *Diaspira* Soós, 1911, *Ditropiphorus* Fukuda, 2000, and *Ditropisena* Iredale, 1933.

Ditropisena is a member of Assimineidae and was removed from the Cyclophoridae on basis of genetic relationship and peculiarities in the structure of radula (Fukuda, Ponder 2003).

The present author is unfamiliar with the morphology and anatomy of *Ditropiphorus* (which currently unites Asian mainland species) and consequently cannot comment on the current position of this taxon. According to E.A.Smith (1897: 417), this group differs from *Ditropopsis* s. str. in having different operculum, e.g. without median process on outer side. According to my experience with material of *Ditropopsis* s. str. from the Papuan biogeographical region, the outer side of operculum can be both derivative or primitive (simple). Further studies should help to clarify the position and validity of *Ditropiphorus* Fukuda, 2000.

In his original description of *Diaspira*, Soós (1911: 346) was unsure about the status and validity of his new taxon: 'I regard for the present this interesting species as representing a distinct genus, though I am noth [sic!] quite convinced, whether it does not belong to *Ditropopsis* E. A. Smith'. The only different characters from *Ditropopsis* were given '... its free whorls and its aperture ...'. The operculum was not described by Soós and remained unknown until Wiktor (1998: 9) described and illustrated them. Despite the very derived operculum in *Ditropopsis biroi* and the closely related *D. mirabilis* sp. nov. (operculum externally with large and broad median tubular conchiolin process), this character alone is not enough to keep both genera separate. In fact, the operculum of several Papuan *Ditropopsis* are remarkable due to the presence of a median conchiolin structure of variable shape and size. I therefore propose a new synonymy below:

***Ditropopsis* E.A.Smith, 1897**

Diaspira Soós, 1911 **syn. nov.**

The following three new species from the Pap-

uan region are described and illustrated below as new to science: *Ditropopsis benthemjuttingi* sp. nov., *D. mirabilis* sp. nov., and *D. tritonensis* sp. nov. Additional information and redescrptions of three other species are presented. Ecological information is given when known.

***Ditropopsis benthemjuttingi* sp. nov.** (Plate 10, figs 1-5; map 1)

Holotype NME: INDONESIA E, Prov. Raja Ampat, distr. Misool Barat, Lilinta (Lelintah) vill. ~13,5 km NW, Biga vill. ~11 km NWW, River Biga valley in the middle of course, 01°57'49"S, 130°11'10"E, 03.IV.2009, primeval lowland rainforest on limestone, leg. K.Greke [the holotype shell is slightly damaged on the top].

Derivatio nominis: Patronymic. This species is named after † W.S.S. van Benthem Jutting, a well-known Dutch malacologist who devoted her life to study of non-marine molluscs of the Indo-Australian archipelago.

Measurements, holotype: Height 2.5 mm, width 3.6 mm, operculum diameter 1.0 mm.

Description: Shell shiny, transparent, colour cream. Shell shape low conical. Whorls 5, the first 1½ - 2 whorls are smooth, following ones reticulated with fine and dense radial lines and spiral striae. Periphery with an extraordinary wide carina. Suture channelled, partly covered with peripheral carina. Umbilicus wide (1/3 of the shell diameter). Base broad, rounded. Aperture circular, channelled at the spiral carina. Peristome a little thickened, continuous, except small fissure in the upper corner. Inner margin is distinctly broadened, outer one is projecting before the inner one. Operculum light brown internally, cream externally; transparent at the centre. Interior surface of operculum arched, formed by distinct concentric growth lines. Exterior surface with long and narrow median tubular non-pubescent conchiolin process which is hollow in the middle, slightly widened and not straight distally.

Diagnosis: Similar to *Ditropopsis papuana* E.A.Smith, 1897 (Indonesian New Guinea: Onin peninsula) and *D. moellendorffi* (O.Boettger, 1891) (Lease Islands: Ambon). *D. benthemjuttingi* clearly differs from these two species by the high spire, presence of a single (peripheral) carina, specific margin, and operculum bearing long median tubular conchiolin process.

Ecology: This species was collected in old growth lowland dipterocarp rainforest on limestone, found on the ground in leaf litter on a very wet place.

Distribution: Only known from valley of River Biga in southern Misool of Raja Ampat Archipelago.



***Ditropopsis fultoni* E.A.Smith, 1897** (Plate 9, fig. 1; Plate 11, figs 1-6; map 1)

Lectotype BMNH [herewith designated from syntypes]: *Ditropopsis* Fultoni, Smith 1897 Types Kapaur, New Guinea 97.7.30.45-6. [handwritten].

Paralectotypes [herewith designated from syntypes] 1 specimen BMNH: same label as in lectotype; 2 specimens SMF: 128004/2 / W-Neuguinea: Kapaur; W. Doherty leg. [handwritten].

I select the specimen No. 1897.7.30.45 as the lectotype and 1897.7.30.46 as paralectotype [shell is damaged in paralectotype from BMNH - with a little cavity].

Additional material 29 specimens [7 NME, 22 KGC]: INDONESIA E, West Papua, Onin peninsula, Fak-Fak 40-42 km NE, between Kokas & Goras vill., 2°43'19"S, 132°37'57"E, 0-10 m, 27.IX.2010, primeval coastal lowland rainforest on limestone, leg. K.Greke.

Measurements: Lectotype height 2.4 mm, width 2.9 mm. Selected adult shells from between Kokas and Goras, North Onin peninsula: Height 3.8 mm, width 4.3 mm; height 3.7 mm, width 4.7 mm; height 3.6 mm, width 4.3 mm; height 3.5 mm, width 4.2 mm; height 3.3 mm, width 4.45 mm with operculum diameter 1.1 mm.

Redescription is based on specimen from KGC sampled between Kokas and Goras, northern coast of Onin Peninsula.

Description: Shell shiny, transparent, colour yellowish. Shell shape conical, with open top and wide umbilicus. Whorls 4¾, the first 1½ whorls are subglobose and smooth, hanging over obliquely to one side and close umbilical channel at top on 1/5 of its space only. Following whorls are delicately striated by radial lines and bear 3 spiral carinae., two of them acute, strong and constant: one at periphery covers the suture, the second encircling umbilical opening. The third carina is on the upper side of each whorl halfway between suture and periphery which disappear after 1½ - 2 whorls. Umbilical channel is wide and open at the top. Base flattened. Aperture circular, channelled at the spiral carinae. Peristome quadrangular, simple, very slightly thickened. Margin slightly broadened. Operculum brown internally, light cream externally; transparent at the centre. Interior surface of operculum is arched, formed by distinct concentric growth lines. Exterior surface concave, simple.

Variability: In some specimens the peripheral carina is absent. Umbilicus width varies from 1/3 to 1/4 of the shell diameter. Specimen shells from northern coast of Onin peninsula are generally less conical and broader. This species is quite variable in size and proportions of the shell.

Ecology: This species was collected in old growth lowland rainforest on limestone very close to the sea (between the seashore and the nearest limestone rock, ~15-20 m from the shore). Specimens sat on wet base of limestone rock, covered by green algae (indet.) in dark conditions.

Distribution: Occurs on Onin peninsula in Indonesian New Guinea and is now recorded both from the southern and northern coast of the peninsula. It was mentioned from Misool (Bentham Jutting 1958) and northern coast of New Guinea (Bentham Jutting 1963), but I am unable to trace specimens to confirm their identification.

***Ditropopsis heterospirifera* (Van Bentham Jutting, 1958)** (Plate 12 figs 1-6; map 1)

Material 8 specimens [2 NME, 6 KGC]: INDONESIA E, Prov. Raja Ampat, distr. Misool Barat, Lilinta (Lelintah) vill. env., 02°02'54"S, 130°16'19"E, 01.IV.2009, secondary moist lowland rainforest on limestone, leaf litter, leg. K.Greke; 10 specimens [2 NME, 8 KGC]: INDONESIA E, Prov. Raja Ampat, distr. Misool Barat, Lilinta (Lelintah) vill. ~13,5 km NW, Biga vill. ~11 km NWW, River Biga valley in the middle of course, 01°57'49"S, 130°11'10"E, 03.IV.2009, primeval lowland rainforest on limestone, leaf litter, leg. K.Greke.

Distribution: Endemic to Misool Island, Raja Ampat Archipelago.

Ecology: This species was collected both in secondary and old growth lowland rainforests on limestone, found in dense leaf litter and on limestone rocks in low light levels (Fig. 2).

Note: This species was previously only known by the type series from Waima and Fakal in northern Misool. This data represents the first record from the southern part of the island.

***Ditropopsis mirabilis* sp. nov.** (Plate 13, figs 1-7; map 1)

Holotype NME: INDONESIA E, West Papua, Onin peninsula, Fak-Fak 10 km E, 2°56'32"S, 132°23'01"E, Sakartemen vill. 1-4 km W, river Sakartemen valley, 350-450 m, 26.IX.2010, primeval lowland rainforest on dolomite, leg. K.Greke.

Paratype 1 specimen KGC: same data as in holotype.

Derivatio nominis: Named from Latin 'mirabilis' (miraculous, extraordinary, uncommon), because of very specific shape of the spire.

Measurements: Holotype: Height 2.4 mm, width 2.1 mm. Operculum diameter 0.64 mm. Paratype: Height 2.1 mm, width 2.0 mm.

Description: Shell shiny, transparent, colour



cream. Shell shape high conical; free whorls form regular accrescent spiral. Three free whorls, except $1\frac{3}{4}$ of the first one. Whorls of the spire are delicately but densely striated by radial lines and bear 3 acute spiral carinae: two strongest at the periphery and third at place of suture. Last and penultimate whorls diverging by about 30° . Aperture circular, channelled at the spiral carinae. Peristome duplicate, slightly thickened. Margin is distinctly broadened except the narrow columellar part, slightly prolongate in the palatal part between two most developed carinae. Operculum brown; transparent at the centre. Interior surface of operculum is arched, formed by distinct concentric growth lines. Exterior surface with large and broad median tubular non-pubescent conchiolin process which is empty in the middle.

Diagnosis: Most close to *D. biroi* (Soós, 1911) (Papua New Guinea: Madang Province) and *D. spiralis* (O.Boettger, 1891) (Lease Islands: Ambon), but clearly differs in having a much higher spire (whorls diverging by more than 30° but distinctly less in both abovementioned species), presence of only 3 spiral carinae on non-embryonic whorls (four or more both in *D. biroi* and *D. spiralis*), and operculum bearing external median tubular non-pubescent conchiolin process (pubescent in *D. biroi*, unknown is or not pubescent in *D. spiralis*). *D. adesmospira* (Moellendorff, 1895) (The Philippines: Luzon) also looks very similar, but differs in having only two carinae (peripheral and superior) on post-embryonic whorls and in width of the shell which is broader than high.

Ecology: This species was collected in old growth lowland rainforest on dolomite, found on the ground in leaf litter in the valley of river between the riverbed and the rock (Fig. 3).

Distribution: Only known from locus typicus, valley of river Sakartemen on Onin peninsula E of Fakfak, Indonesian New Guinea.

***Ditropopsis papuana* E.A.Smith, 1897** (Plate 9, fig. 2)

Lectotype BMNH [herewith designated from syntypes]: *Ditropopsis papuana* Smith 1897 Type. Kapaur, New Guinea 97.7.30.23-4. [handwritten] [the lectotype shell is slightly damaged - with a little cavity].

Paralectotype 1 specimen BMNH [herewith designated from syntypes]: same label as in lectotype.

There are three additional labels by these specimens: 'Lectotype', 'Paralectotype' and 'examined on loan by Dr. R. Ueshima 1994'. The lectotype designation has never been published before. I select the specimen No. 1897.7.30.23 as the lectotype and 1897.7.30.24 as the paralectotype.

Measurements, Lectotype: Height 2.5 mm, width 4.4 mm.

Redescription, lectotype: Shell shiny, transparent, colour pale brown on the base and middle whorls with gentle cream top, last whorl and carinae. Shell shape depressed, low conical. Whorls 4.5, the first two whorls smooth, almost unsculptured. Following ones are delicately striated by radial lines and bear 3 acute spiral carinae: one extraordinary wide on the periphery covers the suture, the second on the underside is also very wide, the third in the umbilical channel. Umbilicus wide (more than $1/3$ of the shell diameter). Aperture circular, channelled at the spiral carinae, slightly curved down. Peristome pentagonal, thickened except the narrow columellar part. Operculum is possibly lost [it was not found in either syntype], but is known from the original description / illustration (Smith 1897: 416 & plate IX, figs 20-23) and redescription published by Kobelt (1902: 79): 'Operculum corneum, circulare, extus rufo-fuscum, concavum, parte prominente conica, cava, in medio instructum, subtus convexum, flavescens, gyros 4-5 exhibens'. According to the original description and illustration, operculum of this species is derivative, exteriorly with bluntly conical median conchiolin process.

Distribution: Occurs on Onin peninsula in Indonesian New Guinea and is known from locus typicus only - Fakfak surroundings.

***Ditropopsis tritonensis* sp. nov.** (Plate 14, figs 1-8; map 1)

Holotype NME: INDONESIA E, West Papua, S Bird's Neck, Kaimana 40 km E, Triton Bay, Lobo vill. & env., $3^\circ 45'33''\text{S}$, $134^\circ 06'11''\text{E}$, 15-150 m, 11-12.IX.2010, secondary & primeval rainforest on limestone, leg. K.Greke [the holotype shell is very slightly damaged on the top].

Paratypes 26 specimens [4 NME, 5 KGC]: same data as in holotype; [7 NME, 10 KGC]: INDONESIA E, West Papua, S Bird's Neck, Kaimana 40 km E, Triton Bay, Lobo vill. env., $3^\circ 45'00''\text{S}$, $134^\circ 05'33''\text{E}$, 100-250 m, 15.IX.2010, primeval lowland rainforest on limestone, leg. M.Kalniņš.

Derivatio nominis: The name derived from locus typicus of this new species, Triton Bay in southern Bird's Neck of Indonesian Papua.

Measurements: Holotype: Height 2.8 mm, width 3.1 mm. Paratypes (selected adult shells): Height 3.2 mm, width 3.55 mm; height 3.0 mm, width 3.2 mm; height 2.95 mm, width 3.4 mm. Paratype operculum diameter 1.1 mm.

Description: Shell shiny, transparent, colour



yellowish. Apical whorls colourless. Shell shape conical, with open top and wide umbilicus. Whorls 5, the first 1½ whorls are subglobose, hanging over obliquely to one side and close umbilical channel on 1/3 of its space. There is a gap in the middle of the first whorl. Following 3½ whorls are striated by radial lines and bear 4 spiral carinae. Three of them acute and constant: one strong on periphery covers the suture, the second (strong, too) encircling umbilical opening, the third one in umbilical channel. Another carina present on the upper side of each whorl halfway between suture and periphery and disappears on the last whorl. Umbilical channel is wide and open at the top. Base flattened. Aperture circular, channelled at the spiral carinae. Peristome cream, pentangular, slightly thickened, with light brown margin. Operculum is light brown internally, cream externally; transparent at the centre. Interior surface of operculum is arched, formed by distinct concentric growth lines. Exterior surface with narrow median tubular non-pubescent conchiolin process which is hollow in the middle and not straight distally. As expected adult shells become slightly

decollate.

Variability: In some specimens the gap in the middle of the first whorl is absent. In this case embryonic whorls strongly shifted from the central axis, so size of umbilical opening varies in top view. Umbilicus width varies from less to more than 1/4 of the shell diameter. This species is quite variable in size and proportions of the shell.

Diagnosis: Similar to *Ditropopsis fultoni* E.A.Smith, 1897 (Indonesian New Guinea: Onin peninsula, northern coast & Misool), but differs in higher spire, stronger radial sculpture, quantity of carinae, and especially in presence of umbilical carina. Operculum is derived in *D. tritonensis* but simple in *D. fultoni*.

Ecology: This species was collected in old growth lowland rainforest on limestone, found on the ground in leaf litter on the basement of Mount Leciysair in dark and wet condition (Fig. 1).

Distribution: Only known from locus typicus, Lobo village surroundings in Triton Bay, southern Bird's Neck, Indonesian New Guinea.

Identification key to *Ditropopsis* from the Papuan region

- 1 Shell cornucopia-like with whorls (except 1.5-2 embryonic ones) more or less distinctly free 2
 - Shell low or high conical, whorls connected one with another along suture 4
- 2 Shell high conical, last and penultimate whorls diverging by about 30°; non-embryonic whorls with 3 spiral carinae; operculum externally with median tubular conchiolin process which is not pubescent *D. mirabilis*
 - Shell low conical, last and penultimate whorls diverging by much less than 30°, often almost subparallel; non-embryonic whorls with 3 or 4 spiral carinae; operculum externally with median tubular conchiolin process which is pubescent or not pubescent 3
- 3 Shell whorls with 4 spiral carinae; operculum externally with bristle of long hairs covering the median tubular process from outside *D. biroi*
 - Shell whorls with 3 spiral carinae; operculum not pubescent externally [this character was not checked by the author] *D. spiralis*
- 4 Embryonic whorls are not detached from the shell (no gap between the embryonic whorls and the rest of spire). Shell very low conical 5
 - Embryonic whorls are detached from the shell (a gap is presented between the embryonic whorls and the rest of spire). Shell more or less high conical, in *D. aenigmatica* low conical 7
- 5 Shell with only one (peripheral) carina *D. benthemjuttingi*
 - Shell with more than one carina 6
- 6 Shell bicarinate, with one peripheric and one basal carina *D. papuana*
 - Shell tricarinate, with two peripheric and one basal carina *D. moellendorffi*
- 7 Last whorl with distinct and dense spiral striation, especially on its underside (Plate 11, fig. 3). Peristome with duplicate and distinctly thickened margin *D. heterospirifera*
 - Last whorl without distinct and dense striation. Peristome with simple or duplicate margin 8
- 8 Last whorl with three or more spiral ridges in umbilical channel. Shell low conical, embryonic whorls more or less depressed and can be invisible in lateral view 9
 - Last whorl with less than three spiral ridges in umbilical channel. Shell higher conical, embryonic whorls not depressed and always visible in lateral view 10



- 9 Last whorl with distinctly visible additional carina between suture and peripheral carina. Shell more flat *D. aenigmatica*
 – Last whorl without additional carina between suture and peripheral carina. Shell comparatively higher *D. ingenua*
 10 Operculum externally with narrow median tubular process. Last whorl with one spiral ridge in umbilical channel *D. tritonensis*
 – Operculum externally concave, simple. Last whorl without ridges in umbilical channel *D. fultoni*

Annotated list of *Ditropopsis* species from the Papuan region

Ditropopsis E.A.Smith, 1897 subgenus *Ditropopsis* s. str.

Type of genus: *Ditropopsis papuana* E.A.Smith, 1897 [designated in this publication]

Diaspira Soós, 1911 [synonymy proposed in this publication]

Type of genus: *Diaspira biroi* Soós, 1911 [monotypy]

Ditropopsis aenigmatica (Van Benthem Jutting, 1963)

Reference: Van Benthem Jutting (1963: 680), as *Ditropis aenigmatica*.

Distribution: Cenderawasih Bay: Biak island.

Ditropopsis benthemjuttingi sp. nov.

Distribution: Raja Ampat Islands: Misool.

Ditropopsis biroi (Soós, 1911)

References: Soós (1911: 346), as *Diaspira Birói*; Le-
schke (1912a: 144), as *Diaspira biroi*; (1912b: 73), as
Diaspira biroi; Thiele (1929: 97), as *Ditropis* (? subgen.
Diaspira) *biroi*; Van Benthem Jutting (1963: 679), as *Dit-*
ropis biroi; Wiktor (1998: 9), as *Ditropis biroi*.

Distribution: Papua New Guinea: Madang Province.

Ditropopsis fultoni E.A.Smith, 1897

References: E.A.Smith (1897: 417), as *Ditropopsis* (?)
Fultoni; Kobelt & Moellendorff (1899: 132), as *Ditro-*
pis (Ditropopsis) fultoni; Kobelt (1902: 79), as *Ditropis*
(*Ditropopsis*) *fultoni*; Zilch (1955: 195), as *Ditropis (Dit-*
ropisena) fultoni; Van Benthem Jutting (1958: 308), as
Ditropis fultoni; (1963: 679), as *Ditropis fultoni*.

Distribution: Indonesian New Guinea: Onin peninsula &
northern coast between Mamberamo river mouth and
Sarmi; Raja Ampat Islands: Misool.

Note: I haven't opportunity to study specimens from
Misool and the northern coast of New Guinea.

Ditropopsis heterospirifera (Van Benthem Jutting, 1958)

References: Van Benthem Jutting (1958: 309), as *Ditro-*
pis heterospirifera; (1963: 680), as *Ditropis heterospir-*
ifera.

Distribution: Raja Ampat Islands: Misool.

Ditropopsis ingenua (O.Boettger, 1891)

References: O.Boettger (1891: 292), as *Ditropis ingen-*
ua; Kobelt (1902: 75), as *Ditropis* s. str. *ingenua*; Van
Benthem Jutting (1953: 285), as *Ditropis ingenua*; Zilch
(1955: 193), as *Ditropis* s. str. *ingenua*; Strack (1993:
51-52).

Distribution: Lease Islands: Ambon.

Ditropopsis mirabilis sp. nov.

Distribution: Indonesian New Guinea: Onin peninsula.

Ditropopsis moellendorffi (O.Boettger, 1891)

References: O.Boettger (1891: 292), as *Ditropis moel-*
lendorffi; Kobelt (1902: 76), as *Ditropis* s. str. *Moellen-*
dorffi; Van Benthem Jutting (1953: 285), as *Ditropis*
moellendorffi; Zilch (1955: 194), as *Ditropis* s. str. *moel-*
lendorffi.

Distribution: Lease Islands: Ambon.

Ditropopsis papuana E.A.Smith, 1897

References: E.A.Smith (1897: 416); Kobelt & Moellen-
dorff (1899: 132), as *Ditropis (Ditropopsis) papuana*;
Kobelt (1902: 79), as *Ditropis (Ditropopsis) papuana*;
Van Benthem Jutting (1963: 679), as *Ditropis papuana*.
Distribution: Indonesian New Guinea: Onin peninsula.

Ditropopsis spiralis (O.Boettger, 1891)

References: O.Boettger (1891: 293), as *Ditropis spi-*
ralis; Kobelt (1902: 78), as *Ditropis* s. str. *spiralis*; Van
Benthem Jutting (1953: 285), as *Ditropis spiralis*; Zilch
(1955: 194), as *Ditropis* s. str. *spiralis*.

Distribution: Lease Islands: Haruku.

Ditropopsis tritonensis sp. nov.

Distribution: Indonesian New Guinea: southern Bird's
Neck, Triton Bay.

Acknowledgements

The author is very grateful to Jonathan Ablett
(BMNH) and Dr. Ronald Janssen (SMF) for the kind-
ly assistance with the very important type material



and help in producing photographs of type specimens stored in the SMF. The author is very obliged to Dr. Katrin Schniebs (Museum of Zoology, Senckenberg Natural History Collections Dresden, DE) and M.Sc. Matthias Hartmann (NME) for assistance with specific publications. Dr. Dmitry Telnov (The Entomological Society of Latvia, Rīga) is thanked for preparing colour photographs of specimens. M.Sc. Mārtiņš Kalniņš (Nature protection board, Sigulda, Latvia) as also D. Telnov are acknowledged for the assistance in sampling specimens on Misool and New Guinea. M.Sc. Darren J. Mann (Oxford University Museum of Natural History, U.K.) is thanked for assistance with proof reading.

References

- Bentham Jutting W.S.S. van 1953. Annotated list of the non-marine Mollusca of the Moluccan islands Ambon, Haruku, Saparua and Nusa Laut. – *Treubia* **22**, No. 2: 275-318.
- Bentham Jutting W.S.S. van 1958. Non-marine Mollusca of the island of Misool. – *Nova Guinea (New Series)* **9**: 293-338.
- Bentham Jutting W.S.S. van 1963. Non-marine Mollusca of West New Guinea. Part 2, Operculate land shells. – *Nova Guinea, Zoology* **23**: 653-726, pls. XXVII-XXX.
- Boettger O. 1891. Ad. Strubell's Konchylien aus Java II und von den Molukken. – *Bericht der Senckenbergischen naturforschenden Gesellschaft zu Frankfurt a.M.* **1891**: 241-318, pls. 3-4.
- Fukuda H. 2000. A new replacement name for *Ditropis* Blanford, 1869 (non Kirschbaum, 1868) (Gastropoda, Architaenioglossa, Cyclophoridae). – *Basteria* **64**, No. 1/3: 1-2.
- Fukuda H., Ponder W.F. 2003. Australian freshwater assimineids, with a synopsis of the recent genus-group taxa of the Assimineidae (Mollusca: Caenogastropoda: Risssooidea). – *Journal of Natural History* **37**, No. 16: 1977-2032.
- Kobelt W., 1902. Cyclophoridae. In: Kobelt W. (ed.) *Das Tierreich. Eine Zusammenstellung und Kennzeichnung der rezenten Tierformen* **16**. Berlin, R.Friedländer und Sohn: I-XXXIX + 1-662 + 110 figs.
- Kobelt W., Moellendorff O. von 1899. Katalog der gegenwärtig lebend bekannten Pneumonopomen. Nachrichten und Berichtigungen. – *Nachrichtenblatt der Deutschen Malakozoologischen Gesellschaft* **31**, No. 9/10: 1-140.
- Leschke M. 1912a. Mollusken der Hamburger Südsee-Expedition 1908/09. (Admiralitätsinsel, Bismarckarchipel, Deutsch-Neuguinea). – *Mitteilungen aus dem Naturhistorischen Museum in Hamburg* **29** (1911): 89-172, 1 pl.
- Leschke M. 1912b. Mollusca (mit Einschluss der Solenogastren und Polyplacophoren) für 1911 (Faunistik, Systematik, Biologie). – *Archiv für Naturgeschichte* **78**, No. 11: 24-91.
- Smith E.A. 1897. On a collection of land-shells from New Guinea. – *The Annals and Magazine of Natural History* **20**, No. 6: 409-420, pl. 9.
- Soós L. 1911. On a collection of land shells from New Guinea and adjacent islands. – *Annales Musei Nationalis hungarici* **9**: 345-356.
- Strack H.L. 1993. Results of the Rumphius Biohistorical expedition to Ambon (1990). Part 1. General account and list of stations. – *Zoologische Verhandlungen Leiden* **289**: 1-72, pls. 1-4.
- Thiele J. 1929-1931. *Handbuch der systematischen Weichtierkunde*. Volume **1**. Jena, Gustav Fischer: 778 pp.
- Wiktor A. 1998. Terrestrial gastropods of the province of Madang in Papua New Guinea. I. Terrestrial Prosobranchia. – *Archiv für Molluskenkunde* **127**, No. 1/2: 1-20.
- Zilch A. 1955. Die Typen und Typoide des Natur-Museums Senckenberg, 15: Mollusca, Cyclophoridae, Cyclophorinae - Cyclophoreae (2). – *Archiv für Molluskenkunde* **84**, No. 4/6: 183-210.

Received: 10 May, 2011

Accepted: 30 May, 2011



Figure 1. Old growth lowland and lower montane rainforest at basement and on slopes of Mt. Lecyansir near Lobo village (Indonesian New Guinea) - habitat of *Ditropopsis tritonensis* sp. nov. (photo: K.Greke).

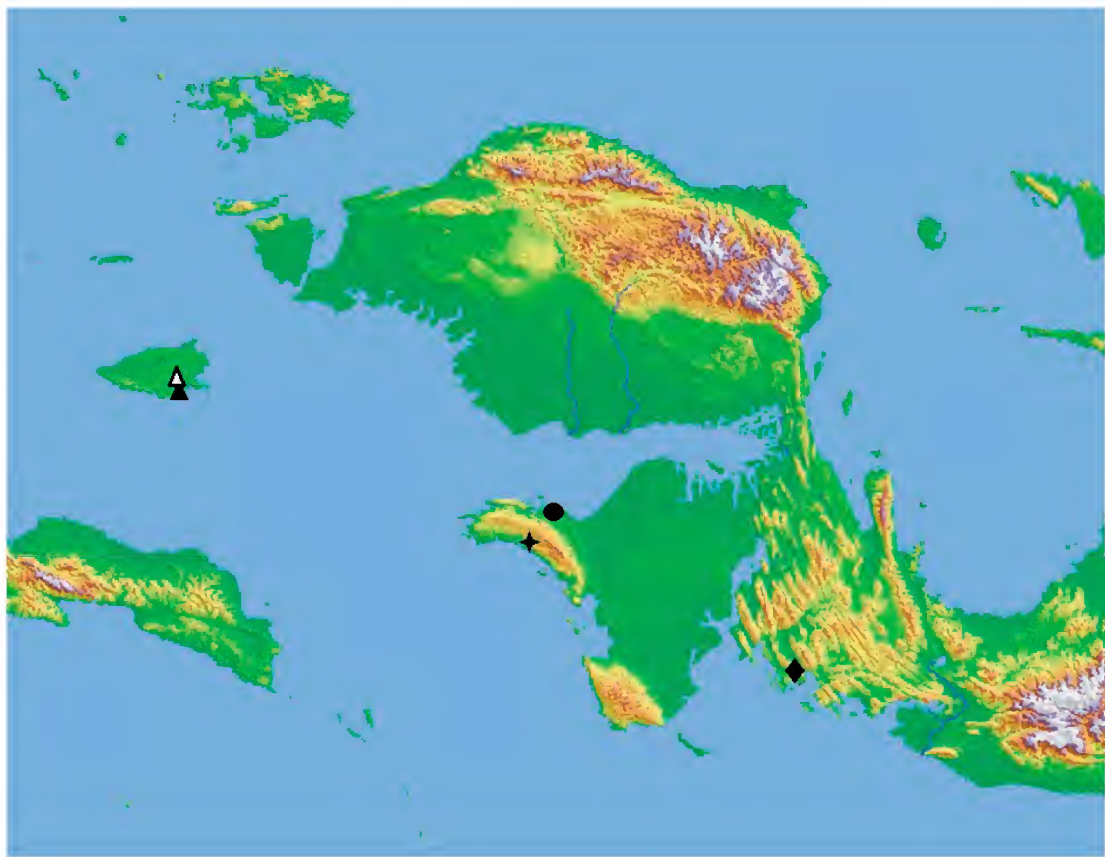




Figure 2. Secondary lowland rainforest on limestone near Lilinta village on southern Misool (Raja Ampat Archipelago) - habitat of *Ditropopsis heterospirifera* (Van Benthem Jutting, 1958) (photo: M.Kalniņš).



Figure 3. Valley of River Sakartemen on southern coast of Onin peninsula (Indonesian New Guinea) - locality of *Ditropopsis mirabilis* sp. nov. (photo: K.Greķe).



Map 1. New sampling localities of *Ditropopsis* in the Papuan region.

Upper triangle - *D. benthemjuttingi* sp. nov.; both triangles - *D. heterospirifera* (Van Benthem Jutting, 1958); circle - *D. fultoni* E.A.Smith, 1897; cross - *D. mirabilis* sp. nov.; rhomb - *D. tritonensis* sp. nov.



Plate 9

GREKE K.: Species of *Ditropopsis* E.A.Smith, 1897 (Architaenioglossa: Cyclophoridae) from the Papuan region



Figure 1. *Ditropopsis fultoni* E.A.Smith, 1897 (lectotype, specimen No. 97.70.30.45), various views (photo: BMNH).

Figure 2. *Ditropopsis papuana* E.A.Smith, 1897 (lectotype, specimen No. 1897.7.30.23), various views (photo: BMNH).

Plate 10

GREKE K.: Species of *Ditropopsis* E.A.Smith, 1897 (Architaenioglossa: Cyclophoridae) from New Guinea ...



Figures 1-5. *Ditropopsis benthemjuttingi* sp. nov. (holotype).

1: shell (lateral view with aperture); 2: shell (top view); 3: shell (bottom view); 4-5: operculum (externally).

Plate 11

GREKE K.: Species of *Ditropopsis* E.A.Smith, 1897 (Architaenioglossa: Cyclophoridae) from the Papuan region



Figures 1-6. *Ditropopsis fultoni* E.A.Smith, 1897, aberrant specimen from between Kokas and Goras, NE Onin peninsula (West New Guinea), with atrophied peripheral carina.
1: shell (lateral view with aperture); 2: shell (top view); 3: shell (bottom view); 4: operculum (internally); 5: operculum (externally); 6: operculum (laterally).

Plate 12

GREKE K.: Species of *Ditropopsis* E.A.Smith, 1897 (Architaenioglossa: Cyclophoridae) from New Guinea ...



Figures 1-6. *Ditropopsis heterospirifera* (Van Benthem Jutting, 1958), specimen from Lilinta surroundings, southern Misool (Raja Ampat Archipelago).

1: shell (lateral view with aperture); 2: shell (top view); 3: shell (bottom view); 4: operculum (internally); 5: operculum (externally); 6: operculum (laterally).

Plate 13

GREKE K.: Species of *Ditropopsis* E.A.Smith, 1897 (Architaenioglossa: Cyclophoridae) from the Papuan region



Figures 1-6. *Ditropopsis mirabilis* sp. nov. (holotype); figure 7. *D. mirabilis* sp. nov. (paratype).

1: shell (lateral view with aperture); 2: shell (top view); 3: shell (bottom view); 4: operculum (internally);
5: operculum (externally); 6: operculum (laterally); 7: aperture with operculum.

Plate 14

GREKE K.: Species of *Ditropopsis* E.A.Smith, 1897 (Architaenioglossa: Cyclophoridae) from New Guinea ...



Figures 1-8. *Ditropopsis tritonensis* sp. nov. (paratype).

1: shell (lateral view with aperture); 2: shell (top view); 3: shell (bottom view); 4: shell (top view, different position);
5: operculum (internally); 6: operculum (externally); 7-8: operculum (laterally).